

REMARKS

Foreign Priority

The acknowledgement, in the Office Action, of a claim for foreign priority under 35 U.S.C. § 119(a)-(d), and that the certified copy of the priority document has been received, is noted with appreciation.

Status Of Application

Claims 1-14 are pending in the application; the status of the claims is as follows:

Claim 4 is rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claims 1 and 4-6 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,445,845 B1 to Sakata et al ("Sakata").

Claims 9 and 11-13 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent Publication No. 2002/0048425 A1 to McBride et al ("McBride").

Claims 9 and 11-13 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,360,775 B1 to Barth et al ("Barth").

Claims 1-3 and 8 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 4,991,925 to Mitchell et al ("Mitchell").

Claim 7 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sakata in view of Barth.

Claim 10 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,493,482 B1 to Al-hemyari et al ("Al-hemyari '482").

Claim 14 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,356,679 B1 to Kapany ("Kapany").

Drawings

The indication, in the Office Action, that the Examiner has no objections to the drawings, is noted with appreciation.

New Claims

Claims 15-18 have been added to provide a more adequate basis of protection of the invention. No new matter was added.

Objection to the Title

The objection to the title of the invention as not being descriptive is noted and a new title is presented in this Amendment which is clearly indicative of the invention to which the claims are directed. Accordingly, reconsideration and withdrawal of the objection is respectfully requested.

Claim Amendments

Claims 4 and 7 have been amended. Claim 4 has been amended to provide proper antecedent basis. Claim 7 has been amended to correctly state what was being claimed. These changes are not necessitated by the prior art, are unrelated to the patentability of the invention over the prior art, and do not introduce any new matter.

35 U.S.C. § 112 Rejection

The rejection of claim 4 under the second paragraph of 35 U.S.C. § 112 as allegedly being indefinite for failing to particularly point out and distinctly claim the

subject matter which Applicant(s) regard as the invention, is respectfully traversed based on the following.

Claim 4 has been amended to provide proper antecedent basis. Thus, this rejection is moot.

Accordingly, it is respectfully requested that the rejection of claim 4 under the second paragraph of 35 U.S.C. § 112 as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant(s) regard as the invention, be reconsidered and withdrawn.

35 U.S.C. § 102(b) Rejections

The rejection of claims 1 and 4-6 under 35 U.S.C. § 102(b) as allegedly being anticipated by Sakata, is respectfully traversed based on the following.

Claims 1 and 4-6 are clearly distinguishable from Sakata.

Claim 1 recites at least the following distinguishing characteristic of the present invention, namely, that *the optical switch including a switching member having a plurality of switching positions for selectively changing the running direction of **two different wavelengths of light** into one of a first direction or a second direction respectively.* This characteristic is clearly illustrated by reference to and comparison of Figs. 1, 11, 12, and 13 of the present invention.

Sakata **does not** disclose the distinguishing characteristic of directing two different wavelengths of light into either a first direction or a second direction respectively. Thus, claim 1 is not anticipated by Sakata.

Claims 4-6 depend from non-anticipated independent claim 1 and are thus also not anticipated by the cited reference.

Accordingly, it is respectfully requested that the rejection of claims 1 and 4-6 under 35 U.S.C. § 102(b) as allegedly being anticipated by Sakata, be reconsidered and withdrawn.

The rejection of claims 9 and 11-13 under 35 U.S.C. § 102(b) as allegedly being anticipated by McBride, is respectfully traversed based on the following.

Claims 9 and 11-13 are clearly distinguishable from McBride.

Claim 9 recites at least the following distinguishing characteristic of the present invention, namely, that there be *a fluid filled groove intersecting an optical waveguide; a switching member movably provided in the groove; and a micro pump coupled to the groove for transferring the liquid in the groove.* The groove containing the liquid, the moveable switching member; and the micro pump are clearly distinct elements. That is, the liquid is a distinct element from the switching member, and the switching element is a distinct element from the micro pump. As recited, both the liquid and the switching member are disposed in the groove, and both are moveable in the groove, while the pump remains fixed.

In contrast, as illustrated in Figs. 2-4, McBride discloses a pair of waveguides 108, 112, and an interface region 126 at the intersection of the two waveguides. (See page 2, paragraph 18). An electrode based actuator 120 comprises: two electrodes 106A and 106B; a microchannel 102; and a fluid 104 (having a refractive index of the waveguides). Air, having a refractive index different than the waveguides, fills the portions of the channel not filled with the liquid in a manner such that at least in a first operation of the electrode based actuator 120, the interface region 126 is filled with air. When actuated, the electrodes of the electrode based actuator 120 form an electric field of variable strength therebetween, thus moving (forcing) the fluid 104 of the electrode based actuator 120 within the channel of the electrode based actuator 120 and across the interface region 126 of the channel, thereby pumping the liquid back and forth (into and away from) across the interface region 126.

According to the Examiner's reasoning in support of his rejection based on McBride, the electrode based actuator 120 acts as a pump and a switching element, as well as provides the liquid within the channel. Therefore, the liquid 104 within the channel 102 and the switching element must be one and the same and are **not** distinct elements. This is supported by the disclosure of McBride. In complete contrast, claim 9, requires that the optical switch comprise at least three distinct elements including: a liquid within the groove, a moveable switching element, and a micro pump. McBride **does not** disclose or suggest a switching member distinct from the liquid where **both** are movably provided in the groove. Therefore, claim 9, is not anticipated by McBride.

As claims 11-13 depend therefrom, they too are not anticipated by McBride.

Accordingly, it is respectfully requested that the rejection of claims 9 and 11-13 under 35 U.S.C. § 102(b) as allegedly being anticipated by McBride, be reconsidered and withdrawn.

The rejection of claims 9 and 11-13 under 35 U.S.C. § 102(b) as allegedly being anticipated by Barth, is respectfully traversed based on the following.

Claim 9 is clearly distinguishable from Barth.

According to Barth, fluid fills a capillary crossing an optical waveguide. As illustrated in Fig. 6A, resistor 316, having the same index of refraction of the waveguide, is positioned within the channel such that it is aligned across a junction of one arm of the optical waveguide. When the resistor is not operational, light is transmitted straight through the fluid filled capillary and the resistor. When the resistor is operational, as illustrated in Fig. 6B, a bubble is formed surrounding the resistor. The air or other fluid inside the bubble has a different index of refraction from the waveguide. Thus, the light is not transmitted therethrough, but instead redirected (e.g., as illustrated from path 340 to path 342).

Barth **does not** disclose a micro pump, nor does it disclose a moveable switching member. First, the resistor in Barth is not a pump. The resistor is actually a heat source which heats the fluid in the capillary to create a vapor bubble. The bubble is only formed when the resistor is operating. The bubble appears, disappears, and can be formed at any position into any of a variety of lengths conforming to the shape of the capillary depending on the operating condition of the resistor. Thus, it is not a separate element.

Thus, claim 9, and thereby claims 11-13 are not anticipated by Barth.

Accordingly, it is respectfully requested that the rejection of claims 9 and 11-13 under 35 U.S.C. § 102(b) as allegedly being anticipated by Barth, be reconsidered and withdrawn.

The rejection of claims 1-3 and 8 under 35 U.S.C. § 102(b) as allegedly being anticipated by Mitchell, is respectfully traversed based on the following.

Claims 2, 3, and 8 depend from independent claim 1. Claim 1 recites the distinguishing characteristic that *the switching member has a plurality of switching positions for selectively guiding each of lights of at least two different wavelengths into the first direction or second direction respectively.*

In contrast, the switching member of Mitchell only directs light in one direction through the optical waveguide. *See* all figures. Light of a wavelength passes in a first direction through the waveguide *to* the optical switch, but the optical switch is only adapted to return the filtered light in one direction through the waveguide. Thus, claim 1, and thereby claims 2, 3, and 8 are not anticipated by Mitchell.

Accordingly, it is respectfully requested that the rejection of claims 1-3 and 8 under 35 U.S.C. § 102(b) as allegedly being anticipated by Mitchell, be reconsidered and withdrawn.

35 U.S.C. § 103(a) Rejections

The rejection of claim 7 under 35 U.S.C. § 103(a), as allegedly being unpatentable over Sakata in view of Barth, is respectfully traversed based on the following.

Claim 7 depends from independent claim 1. At least for the reasons presented above with respect to claim 1, claim 7 is not obvious with respect to either Sakata or Barth individually.

Additionally, there is no motivation within the references to combine the references, nor would such a combination provide the device of claim 1 of the present application without undue experimentation and resorting to impermissible hindsight. Sakata **does not** disclose the distinguishing characteristic of claim 1 of directing two different wavelengths of light into either a first direction or a second direction respectively. Further, Barth **does not** disclose the distinguishing characteristic of a micro pump. Neither does Barth disclose a moveable switching member. Thus, no combination of the two references would provide the device of claim 1 of the present application without undue experimentation and resorting to impermissible hindsight. Accordingly, claim 1, and thereby claim 7, is not obvious with respect to the cited references, either singly or in combination.

Additionally, with regard to claim 7, as acknowledged on page 6 of the Office Action, Sakata is silent as to how the switching member is moved. Thus, for this reason as well, claim 7 is not obvious with respect to the cited references, either singly or in combination.

Accordingly, it is respectfully requested that the rejection of claim 7 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sakata in view of Barth, be reconsidered and withdrawn.

The rejection of claim 10 under 35 U.S.C. § 103(a), as allegedly being unpatentable over Al-hemyari '482, is respectfully traversed based on the following.

Claim 10 depends from independent claim 9. Claim 9 requires that a micro pump be coupled to the groove, and be for transferring the liquid in the groove. Al-hemyari fails to disclose or suggest that a micro pump be coupled to the groove. Further, the actuator 33 of the switching element 130 of Al-hemyari is not for transferring the liquid in the groove. Instead, according to Al-hemyari, a linking element 10 couples the actuator 33 of the switching element 130 to a shutter 17 stationed within an air filled trench 15. It would not have been obvious to one of ordinary skill in the art to provide a micro pump to transfer the air in the trench of Al-hemyari, as doing so would not change the position of the shutter 17 linked to the actuator 33. Thus, claim 9 and thereby claim 10, is not obvious with respect to Al-hemyari.

Accordingly, it is respectfully requested that the rejection of claims 10 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Al-hemyari '482, be reconsidered and withdrawn.

The rejection of claim 14 under 35 U.S.C. § 103(a), as allegedly being unpatentable over Barth in view of Kapany, is respectfully traversed based on the following.

Claim 14 depends from claim 1. As discussed above, Barth fails to disclose or suggest a moveable switching member. Instead, the resistor merely heats up surrounding fluid and a bubble forms so long as the resistor is activated. More importantly, Barth fails to disclose or suggest a switching member which has a plurality of positions for selectively guiding each of lights of two different wavelengths into the first direction or second direction, respectively, or any means of directing one of two different wavelengths of light to a first direction while directing the second of the two different wavelengths of light to a second direction.

Kapany discloses stationary switching members formed as thermal expansion elements (TEE). A resistor acts as a thermal controller 35 to control the state of the TEE. When the TEE are heated, the TEE is caused to switch from its contracted state to its expanded state. When cooled the TEE contracts. In the contracted state, the TEE defines

airgaps 25 in the path of light traveling along the first waveguide segment 15a. This causes the light to undergo total internal reflection and pass into third waveguide segment 15c. When the TEE is in its expanded state, it fills the air gap and thereby allows the light to pass into second waveguide segment 15b. Thus, the TEE routes light by means of a temperature controller. Kapany does not disclose or suggest a moving switching member.

A combination of the above two references would not provide the device of claim 1 of the present application. Kapany operates using thermally contracting or expanding a thermal expansion element, and Barth by heating a liquid to form a vapor bubble. Thus, one skilled in the art would not have been motivated to combine the two references, and claim 1 is not rendered obvious by Barth or Kapany, either singly or in combination.

Claim 14 depends from claim 1 and would therefore also not be rendered obvious by the above combination of references. Further, as acknowledged on page 8 of the Office Action with respect to claim 14, Barth fails to teach the use of an interference filter as the moveable switching element. Thus, for this reason as well, claim 14 is further not obvious with respect to the above combination of references.

Accordingly, it is respectfully requested that the rejection of claim 14 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Barth in view of Kapany, be reconsidered and withdrawn.

New Claims

For the reasons provided above with respect to claim 1, claims 15-18 are also not anticipated by nor rendered obvious by the above cited references, either singly or in any combination.

Accordingly, it is respectfully requested that claims 15-18 be allowed.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the number of independent claims by 1 from 2 to 3 (3 previously paid for) and increases the total number of claims by 4 from 14 to 18 (20 previously paid for), but does not present any multiple dependency claims. Accordingly, no fee based on the number or type of claims is currently due. However, if a fee, other than the issue fee, is due, please charge this fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260.

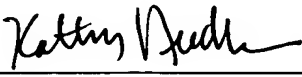
Any fee required by this document other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

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Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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